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(54) IMAGE FORMING DEVICE

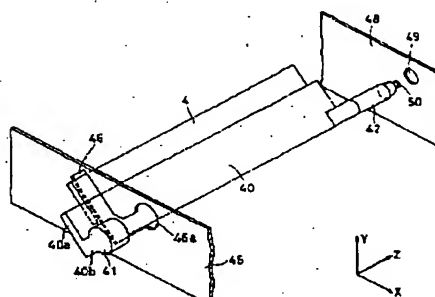
(57) Abstract:

PROBLEM TO BE SOLVED: To obtain a device in which the position of an electrostatic charging point where a transfer blade abuts on a transfer belt is detached against a transfer material nip where a photosensitive drum and the transfer belt come into contact with each other by constituting the device that a swing center member of a transfer electrostatic charging means serves as well a positioning member for a frame body supporting a roller member.

SOLUTION: A transfer blade 4 is supported in a freely swinging state to a front boss 41 and a rear boss 42 supporting a roller member where a transfer belt is extended rotatably and a member being the center of its swing serves as well a positioning member for a front side plate 45 and a rear side plate 48. In this device, the front boss 41 engages with a circular part 46a and the rear boss 42 engages with a round hole 49 so that both the bosses 41 and 42 jointly support the transfer blade 4 and a holder 40 in a freely swing state for the front side plate 45 and rear side plate 48, namely, a transfer belt unit. Consequently, since components affecting the position precision of the electrostatic charging point for the transfer material nip decrease,

deterioration in the position precision due to the size tolerance of the components becomes small.

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3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] At least one image support in which a picture is formed. The imprint material support which supports and conveys imprint material. An imprint electrification means to face the aforementioned image support through this imprint material support. It is image formation equipment equipped with the above, and the aforementioned imprint electrification means is supported free [rocking] by the frame which supports the roller member by which the aforementioned imprint material support was stretched free [rotation], and it is characterized by the member used as the center of oscillation serving as the positioning member to the aforementioned frame.

[Claim 2] Image formation equipment of the claim 1 characterized by being $\theta > 45$ degrees when setting to θ the angle which the straight line which connects the imprint position and the aforementioned center of oscillation of the aforementioned imprint electrification means makes to the normal of the image support in the aforementioned imprint position.

[Claim 3] The aforementioned imprint electrification means is image formation equipment of the claim 2 characterized by being the plate-like part material which has conductivity, or a brush-like member, and the angle ϕ which the aforementioned flat surface makes to the normal of the aforementioned image support in an imprint position being $\phi < \theta$ when it is considered that this plate-like part material or a brush-like member is a flat surface.

[Claim 4] The aforementioned imprint electrification means is image formation equipment of the claim 1 characterized by giving adjustment which is plate-like part material and guarantees the distance of the edge and center of oscillation to a predetermined value.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the image formation equipment by the electrophotography method used as a copying machine or a printer.

[0002]

[Description of the Prior Art] Although the image formation equipment which is equipped with two or more image formation sections, forms conventionally the toner image with which colors differed in each image formation section, respectively, and imprints this toner image one by one to the same imprint material, and the so-called color picture formation equipment are proposed variously, the color picture formation equipment by the multicolor electrophotography method is used abundantly in it.

[0003] An example of this color electrophotography image formation equipment is briefly explained based on drawing 4. the inside of the main part of equipment of color electrophotography image formation equipment -- the [the 1st, the 2nd, the 3rd, and] -- 4 image-formation sections Pa, Pb, Pc, and Pd should be put side by side, and the picture of a respectively different color should pass each process of a latent image, development, and an imprint -- it is formed That is, the 1st - 4th image formation section Pa-Pd By the image support of exclusive use, and this example, respectively Electrophotography photoconductor

drum (only henceforth "photoconductor drum") 1a, 1b, 1c, and 1d Photoconductor drums 1a-1d which possessed and were formed in each image formation section Pa-Pd It imprints on the imprint material 6 supported and conveyed on the imprint material support 8 which the upper toner image adjoins and moves to each image formation section Pa-Pd. Furthermore, in the fixing section 7, it heats and pressurizes, and after being fixed to the toner image on the imprint material 6, it is discharged as a record picture outside the plane.

[0004] If it furthermore explains, they are photoconductor drums 1a-1d. The polygon mirror 17 for carrying out the scan of the light emitted from the exposure lamps 21a, 21b, 21c, and 21d, the drum electrification machines 2a, 2b, 2c, and 2d, light equipment (not shown), and this light equipment to a periphery, and potential sensors 22a, 22b, 22c, and 22d It is prepared. The laser beam emitted from light equipment is minded for the polygon mirror 17, ftheta lens (not shown), etc., and they are photoconductor drums 1a-1d. It scans and the latent image according to the picture signal is formed on each photoconductor drum.

[0005] The latent image formed on each photoconductor drum 1a-1d is developed as a toner image with the development counters 3a, 3b, 3c, and 3d which held cyanogen, a Magenta, yellow, and each color developer of black, respectively.

[0006] This toner image is imprinted on the imprint material 6 which is supplied to the imprint material support 8 through the resist roller 13 from the imprint material cassette 60, and is conveyed through each image formation section by the imprint material support 8.

[0007] The imprint material support 8 is the film of dielectric resins, such as a polyethylene-terephthalate resin film sheet (PET sheet), a polyvinylidene-fluoride resin film sheet, and a polyurethane-resin film sheet, in this example, piles up the both ends mutually and joins, and or it would not make it an endless configuration, the belt (seamless) which does not have a joint is used.

[0008] If this imprint material support 8 begins to rotate, the imprint material 6 sent out from the imprint material cassette 60 will be supplied to the imprint material support 8 from the resist roller 13. A picture beginning signal is set to being turned on at this time, a certain timing performs image formation on 1st photoconductor drum 1a, and a toner image is formed. This toner image is imprinted on the imprint material 6 by the electric field of imprint electrification means 4a or the charge grant operation made into corotron. At this time, the imprint material 6 will be in the state where it was held by the electrostatic adsorption power on the imprint material support 8, it is conveyed by the following 2nd image formation section Pb and a following pan in this state to the 3rd and 4th image formation section Pc and Pd, and a toner image is imprinted, respectively. Thus, the imprint material 6 by which the toner image of the last 4th image formation section Pd was imprinted is discharged with the separator electrical machinery 14 and the ablation electrification vessel 15, and an electrostatic adsorption power decreases it by that cause, it secedes from the imprint material support 8, and is conveyed to the fixing section 7.

[0009] The fixing section 7 is equipped with the fixing roller 71 and the pressurization roller 72, and makes a fixing picture the toner image on the imprint material fed by heating and pressurization.

[0010] After an imprint, the developer which remained on photoconductor drum 1a-1d is removed by the photo conductor cleaning sections 5a, 5b, 5c, and 5d, and the next latent-image formation performed succeedingly is equipped with it. Moreover, after the developer which remained on the imprint material support 8 is discharged with the belt electric discharge vessel 12 and has an electrostatic adsorption power removed, it fails to be scratched with the fur brush 16 which rotates with relative velocity to the imprint material support 8 in the belt cleaning section 9: If it considers as a belt cleaning means, generally a blade, nonwoven fabrics, or those combined use are used well.

[0011] In the above-mentioned composition, in order to imprint the toner image formed on an image support 1 like a photoconductor drum good on the imprint material 6, the specification-part material for intercepting imprint electric field in the contacting point upstream of the image support 1 and the imprint material support 8 may be arranged. That is, in order to perform an imprint which reproduces the toner image on the image support 1 faithfully, it is required to prevent that the coloring-material particle which regulates imprint electric field and forms the toner image, and the so-called toner scatter.

[0012] For this reason, although the specification-part material 403 (403a, 403b, 403c, 403d) can also be formed in the corotron 4 generally well used as an imprint electrification means as shown in drawing 4 and drawing 5, the electrode 4 of a tabular as shown in a brush configuration or drawing 7 as shown in drawing 6 as easiest composition, and using especially a flat electrode are performed frequently. the contact electrode 4 of this tabular -- the tabular conductivity blade 401 as an electric-field grant member -- having -- a blade 401 - - an electrode -- predetermined voltage is impressed through a member 402 Also in this case, forming the electric-field specification-part material 403 in an imprint upstream is proposed.

[0013]

[Problem(s) to be Solved by the Invention] However, in above-mentioned image formation equipment, when the tabular contact electrode 4 was especially used as a simple imprint electrification means, there were the following problems about the relative-position precision of the point of contact to the imprint material of the tabular contact electrode 4, and the image support 1. That is, there was a fault that are easy to separate from the point of contact (henceforth the "electrification point") of the tabular contact electrode 4 from the width of face (henceforth an "imprint material nip") to which the image support 1 touches the imprint material 6 or the imprint material support 8 to the imprint material support 8, electric discharge arose in the non-contact field of the imprint material 6 and the image support 1, and an imprint was not performed correctly, therefore a high definition picture was not acquired.

[0014] Drawing 8 - drawing 11 explain further the cause from which an imprint material nip and the electrification point tend to separate here.

[0015] The imprint belt unit which drawing 8 is made to rotate the imprint belt 8 and the imprint belt 8 which are an imprint material support, and contains the drive roller 10 which carries out firm-bridging support, and two follower rollers 11 and 12, and photoconductor drum [the 1st which set the predetermined interval in the upper part of the imprint belt 8, and was arranged in the shape of a tandem - the 4th photoconductor drum 1a-1d] physical relationship is shown.

[0016] The imprint blade unit including the rocking shafts 26a, 26b, 26c, and 26d supported free [rocking of the blade electrode holders 22a, 22b, 22c, and 22d and the blade electrode holders 22a-22d for supporting the imprint blades 4a-4d which are tabular contact electrodes, and the imprint blades 4a-4d] is prepared in the interior of the shape of an ellipse which the imprint belt 8 forms.

[0017] The propleuron 20 and epimeron 36 (refer to drawing 9) which are a frame for supporting the imprint blades 4a-4d are prepared in the side of the imprint belt 8, and the openings 21a, 21b, 21c, and 21d for taking out and inserting each imprint blade unit are drilled by the propleuron 20.

[0018] Imprint blade support-plate 23a for an imprint blade unit supporting this unit to a propleuron 20 and an epimeron 36, 23b, 23c, and 23d are included further. each imprint blade support plates 23a-23d The 1st pin 24a, 24b, 24c, and 24d of caulking **** and the 2nd pin 25a, 25b, 25c, and 25d are positioned by fitting into the hole (it being un-illustrating to drawing 8) drilled by the propleuron 20 so that it may project horizontally towards a propleuron 20.

[0019] Photoconductor drums 1a, 1b, 1c, and 1d are positioned by the propleuron 20 and epimeron (drawing 8 un-illustrating) of the main part of equipment, respectively. The imprint belt unit is constituted by the rockable focusing on the axis of rotation 27 of the drive roller 10, and the drive roller 10 is positioned by the propleuron 20 and epimeron of the main part of equipment like photoconductor drums 1a-1d.

[0020] Drawing 9 is the important section perspective diagram showing the composition around imprint blade 4a corresponding to the image formation section Pa.

[0021] this ***** -- the imprint blade unit contains further imprint blade support-plate 23a for supporting this unit to a propleuron 20 and an epimeron 36 as mentioned above Imprint blade support-plate 23a has width of face smaller than the pre-set-up section 23a1 prolonged in a longitudinal direction so that opening 21a may be covered, and the breadth of opening 21a, and consists of the post-set-up sections 23a3 which set up the lower part from the

horizontal level 23a2 prolonged in an epimeron 36 side, and the edge of a horizontal level 23a2 along with electrode-holder 22a.

[0022] Rocking shaft 26a makes the front end section a boss, and is supported respectively free [rocking] by making the back end section into a boss by the pre-set-up section 23a1 at the post-set-up section 23a3.

[0023] As mentioned above, round hole 31a and horizontally long round-head slot 32a are drilled in the position corresponding to [in 1st pin 24a and 2nd pin 25a] 1st pin 24a and 2nd pin 25a in caulking ** and a propleuron 20 at the pre-set-up section 23a1 of imprint blade support-plate 23a so that it may project horizontally towards a propleuron 20.

[0024] the [and] -- when 1 pin 24a fits into round hole 31a, the position of the direction of X and the direction of Y is decided, and when 2nd pin 25a fits into round-head slot 32a, the position of the direction of Y is decided

[0025] Similarly, 1st gage-pin 37a and 2nd gage-pin 38a are drilled in caulking ** and the post-set-up section 23a3 by round hole 33a and round-head slot 34a corresponding to both the pins 37a and 38a, respectively so that it may project horizontally in an epimeron 36 towards the post-set-up section 23a3 of imprint blade support-plate 23a.

[0026] And pin 37a fits into round hole 33a, the position of X and the direction of Y is decided, pin 38a fits into round-head slot 34a, and the position of the direction of Y is decided.

[0027] The post-set-up section 23a3 side in rocking shaft 26 of blade electrode-holder 22a is projected as a boss 26a2 who made the electrification electrode inherent. It is the center of oscillation with the boss 26a1 who is the front end section of rocking shaft 26a which fitted in with round hole 35a drilled in the post-set-up section 23a3, and fitted into round hole 35a prepared in the pre-set-up section 23a1 of rocking shaft 26a.

[0028] A boss 26a2 extends to a Z direction further, penetrates hole 39a of an epimeron 36, contacts an imprint electrification supply electrode (un-illustrating) as an electrode, and has the composition of impressing imprint high pressure to imprint blade 4a.

[0029] Imprint blade 4a and blade electrode-holder 22a are unified, and the point of imprint blade 4a contacts photoconductor drum 1a through the imprint belt 8 by the torsion coil spring (un-illustrating).

[0030] The position precision of the electrification point of imprint blade 4a which contacts to the imprint belt 8 to the imprint nip to which the imprint belt 8 contacts photoconductor drum 1a as the above explanation shows goes via the precision of the main part order side plate of equipment, the precision of the imprint unit order side plates 20 and 36, and the precision of imprint blade support-plate 23a, a further goes via all the precision of blade electrode-holder 22a and imprint blade 4a, and it is decided synthetically.

[0031] Thus, since part tolerance is accumulated by X and Y both directions, precision becomes bad, so that there are many parts via which it goes although precision is determined.

[0032] Moreover, as conventionally shown in the model view of drawing 10, when its attention was paid to the center of oscillation B of the imprint blade 4, i.e., the center of the rocking shaft 26, at the straight line C which connects the center of oscillation B to the electrification point A with which the imprint blade 4 contacts the imprint belt 8, the angle theta to the normal D of the photoconductor drum 1 in the imprint position A was constituted smaller than 45 degrees.

[0033] from this, it is shown in drawing 11 -- as -- the center of oscillation B -- if a gap of the size of the direction of Y is especially large -- namely, $B + \Delta Y1$ -- or if it shifts $B - \Delta Y1$, a gap of $A - \Delta X2$ and $A + \Delta X1$ will arise [the electrification point A] from an ideal position in the direction of X, respectively

[0034] Moreover, as shown in drawing 12, when the gap of the distance E between AB(s) was large, namely, when it shifted $E - \Delta E1$, there was $E + \Delta E1$ or a fault that a gap of $A - \Delta X4$ and $A + \Delta X3$ arose [the electrification point A] from the ideal position of the direction of X.

[0035] Therefore, the purpose of this invention is offering the image formation equipment which can hold down from an ideal position to dispersion in the size below the specified quantity, and can obtain a quality transfer picture, without the position of the electrification

point with which an imprint electrification means contacts to an imprint material support to the imprint material nip which an image support and an imprint material support contact separating.

[0036]

[Means for Solving the Problem] The above-mentioned purpose is attained by the image formation equipment concerning this invention. In the image formation equipment with which this invention was equipped with at least one image support in which a picture is formed, the imprint material support which supports imprint material and is conveyed, and an imprint electrification means to face the aforementioned image support through this imprint material support when summarizing It is image formation equipment with which the member which the aforementioned imprint electrification means is supported free [rocking] by the frame which supports the roller member by which the aforementioned imprint material support was stretched free [rotation], and serves as the center of oscillation is characterized by serving as the positioning member to the aforementioned frame.

[0037] When setting to θ the angle which the straight line which connects the imprint position and the aforementioned center of oscillation of the aforementioned imprint electrification means makes to the normal of the image support in the aforementioned imprint position, it is desirable that it is $\theta > 45$ degrees. It is the plate-like part material which has conductivity, or a brush-like member, and when it is considered that this plate-like part material or a brush-like member is a flat surface, as for the aforementioned imprint electrification means, it is desirable that the angle ϕ which the aforementioned flat surface makes to the normal of the aforementioned image support in an imprint position is $\phi < \theta$. The aforementioned imprint electrification means is plate-like part material, and it is desirable to give adjustment which guarantees the distance of the edge and center of oscillation to a predetermined value.

[0038]

[Embodiments of the Invention] Hereafter, the image formation equipment concerning this invention is ^{**}(ed) on a drawing, and is explained in more detail. In addition, in explanation of the following example, this invention shall be embodied to the image formation equipment shown in drawing 4. Therefore, the explanation about the overall composition and the function of image formation equipment is omitted, and explains the feature portion of this invention.

[0039] Drawing 1 is drawing which expresses the feature of this invention best, and corresponds with drawing 9 explaining the conventional example.

[0040] In drawing 1, the imprint blade 4 which is an imprint electrification means consists of plate-like part material, and is supported by the imprint blade electrode holder 40. The imprint blade electrode holder 40 is constituted from bosses 41 and 42 before and after preparing in a supporter 40a [which is prolonged along with the imprint blade 4], flection 40b [which was crooked right-angled to supporter 40a], and flection 40b order edge by cross-section abbreviation L form, and the electrode 50 is attached in the back boss's 42 point.

[0041] The opening 46 of the abbreviation L form for taking out and inserting the imprint blade 4 and the imprint blade electrode holder 40 in one is drilled, and circular section 46a for supporting free [rotation of the former boss 41] to a part of this opening 46 is formed in the propleuron 45 which is the frame of an imprint belt unit.

[0042] Moreover, an electrode 50 is penetrated to the epimeron 48 of an imprint belt unit, and the round hole 49 for supporting the back boss 42 free [rotation] is drilled in it.

[0043] As mentioned above, when the former boss 41 fits in with circular section 46a and the back boss 42 fits in with a round hole 49, both the bosses 41 and 42 are jointly supported free [rocking] to a propleuron 45 and an epimeron 48, i.e., an imprint belt unit, in the imprint blade 4 and a electrode holder 40.

[0044] The electrode 50 which projected from the back boss 42 is considered as the composition which contacts the imprint electrification supply electrode (un-illustrating) arranged in the Z direction back side of an epimeron 48, and impresses imprint high pressure to the imprint blade 4.

[0045] It is unified and the imprint blade 4 and a electrode holder 40 contact the photoconductor drum 1 which is an image support through the imprint belt 8 whose point of

the imprint blade 4 is an imprint material support by the torsion coil spring (un-illustrating).
[0046] Moreover, if the direction of the former boss's 41 path is constituted greatly and the member used as the center of oscillation of the imprint blade 4, the former boss 41 who serves both as positioning ***** and the back boss 42 naturally compare circular section 46a of a propleuron 45 with the round hole 49 of an epimeron 48, corresponding to the path of the former boss 41 and the back boss 42, the direction of circular section 46a is constituted greatly. The back boss 42 by the side of the Z direction back can overcome circular section 46a of a propleuron 45 easily, and an imprint blade unit can be easily taken out by this and inserted to an imprint belt unit.

[0047] omitting the imprint blade support plate 23 compared with the conventional example as mentioned above according to this example -- possible -- a cost side or a space side -- curtailment -- eye a possible hatchet -- it is advantageous

[0048] Moreover, in this example, by having served as positioning to the center of oscillation and the imprint frame of plate-like part material which are an imprint electrification means, since the parts which influence the position precision of the electrification point to an imprint material nip compared with the conventional example decrease in number, degradation of the position precision by the dimensional tolerance of parts becomes small. Moreover, since the position of the electrification point can be guaranteed to the position of an ideal in the field of an imprint material nip, a high definition transfer picture without picture disorder can be obtained.

[0049] Drawing 2 is the outline front view showing the imprint blade 4 and center-of-oscillation order bosses' 41 and 42 physical relationship.

[0050] If the centers of oscillation 41 and 42 of the imprint blade 4 pay their attention to the straight line C which connects the center of oscillation B to the electrification point A with which the imprint blade 4 contacts the imprint belt 8, its angle theta to the normal D of the photoconductor drum 1 in an imprint position is larger than 45 degrees, and they are set up with the value near 90 degrees.

[0051] Thus, since the position of the electrification point becomes insensible geometrically and the ideal range can be guaranteed by having established the position of the center of oscillation in the range of 45 degrees or more to the normal of a photoconductor drum even when the gap from the position of the ideal of the position of the center of oscillation is to some extent large, a high definition transfer picture can be obtained.

[0052] Moreover, the imprint blade 4 is set up so that the angle phi to Normal D may become smaller than theta.

[0053] A high definition transfer picture can be obtained without causing electric discharge near the upstream of the electrification point, and disturbing a picture, since the angle phi which makes the posture of a tabular or a brush-like member to a normal was set up by $\phi < \theta$ even if it was the composition of having brought the center of oscillation close to 90 degrees more at $\theta > 45$ degrees to the normal of a photoconductor drum, when an imprint electrification means was plate-like part material or a brush-like member.

[0054] Moreover, drawing 3 is the conceptual diagram of adjustment for the position precision guarantee of the imprint blade proposed by this invention:

[0055] the hatching section in drawing is the datum level 60 of an adjustment fixture, and can tune a position for this field top finely in the direction of Q to datum level 60 -- it is attached and the reliance block 61 is laid Since the size p in drawing varies to some extent with the part precision of a electrode holder 40, bosses' 41 and 42 center justifies block 61 so that a size p may be read by the monitor means (un-illustrating) and the size r in drawing which connects B used as A points used as the electrification point and the center of oscillation may become fixed. It is possible for the imprint blade 4 and a electrode holder 40 not to be unified yet, but to let it slide relatively in the direction of Q at this time.

[0056] since the value of q is decided based on the value of p and the block 61 is justified, the nose of cam A of the imprint blade 4 and distance $AB=r$ based on [B] the center of oscillation-cum-positioning are remarkable by unifying the imprint blade 4 and a electrode holder 40 on a screw etc., where it was attached to the block 61 and the imprint blade 4 is applied (un-illustrating) -- it can guarantee uniformly with high precision

[0057] Thus, since it is not influenced [the] at all though the dimensional tolerance of the

member relevant to plate-like part material varies greatly by giving the adjustment method of guaranteeing uniformly the distance of the point of plate-like part material, and the center of oscillation, and the position of the electrification point is guaranteed, a high definition transfer picture can be obtained.

[0058] Moreover, as for a photoconductor drum, the thing of a comparatively thin diameter with a diameter of 20-30mm is increasingly used in recent years for the miniaturization of equipment, and low-cost-izing. In connection with this, the imprint material nip which can stick and imprint a toner image is a direction which becomes still smaller, and it is expected that this effect of the invention which guarantees the position precision of the electrification point will increase importance increasingly from now on.

[0059]

[Effect of the Invention] According to the image formation equipment of this invention, so that clearly from the above explanation an imprint electrification means When it is supported free [rocking] by the frame which supports the roller member by which the imprint material support was stretched free [rotation] and the member used as the center of oscillation serves as the positioning member to the aforementioned frame Without the position of the electrification point with which an imprint electrification means contacts to an imprint material support to the imprint material nip which an image support and an imprint material support contact separating, it can hold down from an ideal position to dispersion in the size below the specified quantity, and, therefore, a quality transfer picture can be obtained.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the important section perspective diagram showing one example of the imprint blade concerning this invention.

[Drawing 2] It is the front view concerning the example of drawing 1.

[Drawing 3] It is the conceptual diagram of adjustment for the position precision guarantee of the imprint blade of drawing 1.

[Drawing 4] It is the outline block diagram showing an example of the conventional image formation equipment with which this invention is embodied.

[Drawing 5] It is the cross section showing the conventional imprint electrification means (corotron).

[Drawing 6] It is the cross section showing other examples (brush-like electrode) of the conventional imprint electrification means.

[Drawing 7] It is the cross section showing the example of further others of the conventional imprint electrification means (flat electrode).

[Drawing 8] It is the block diagram showing an example of the important section in conventional image formation equipment.

[Drawing 9] It is the important section perspective diagram showing the conventional imprint blade and its circumference.

[Drawing 10] It is the front view showing the imprint blade and the circumference of drawing 9

[Drawing 11] It is explanatory drawing showing a gap of an imprint position when the center of oscillation of an imprint blade shifts perpendicularly (the direction of Y).

[Drawing 12] It is explanatory drawing showing a gap of an imprint position when the center of oscillation of an imprint blade and the distance of an imprint position change.

[Description of Notations]

1 Photoconductor Drum (Image Support)

4 Imprint Blade (Imprint Electrification Means)

8 Imprint Belt (Imprint Material Support)

40 Blade Electrode Holder

41 Former Boss (Center-of-Oscillation Member, Positioning Member)

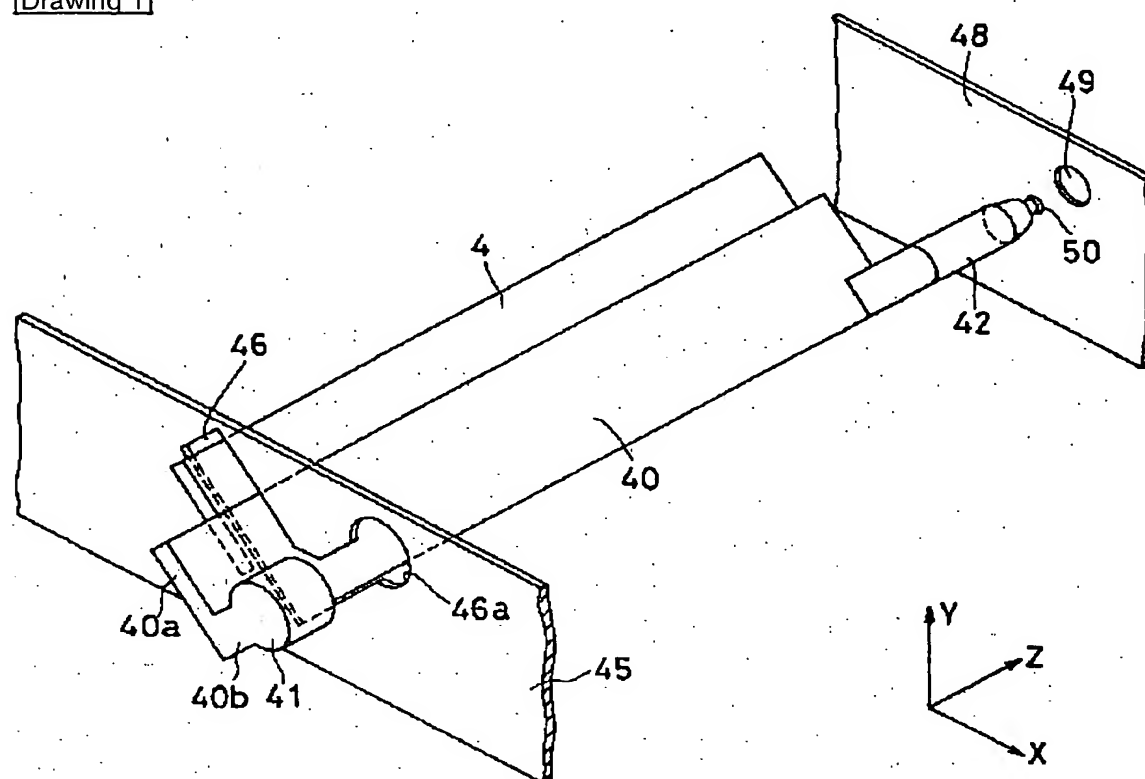
42 Back Boss (Center-of-Oscillation Member, Positioning Member)

45 Propleuron (Frame)

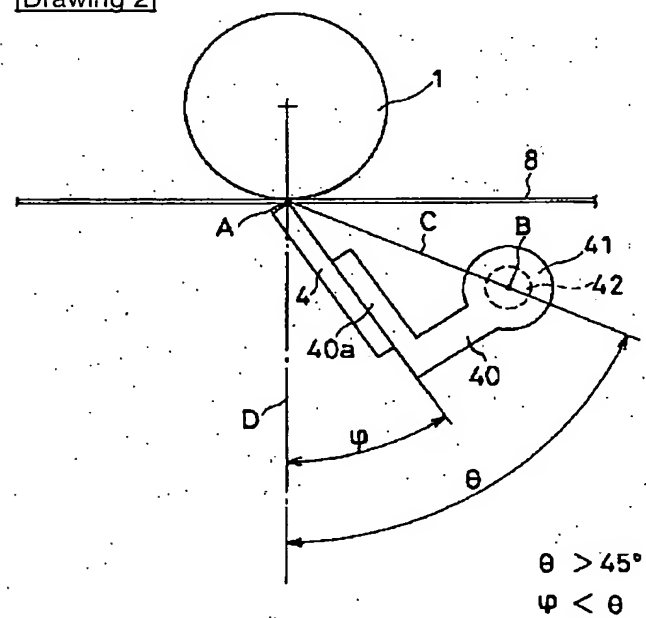
48 Epimeron (Frame)

DRAWINGS

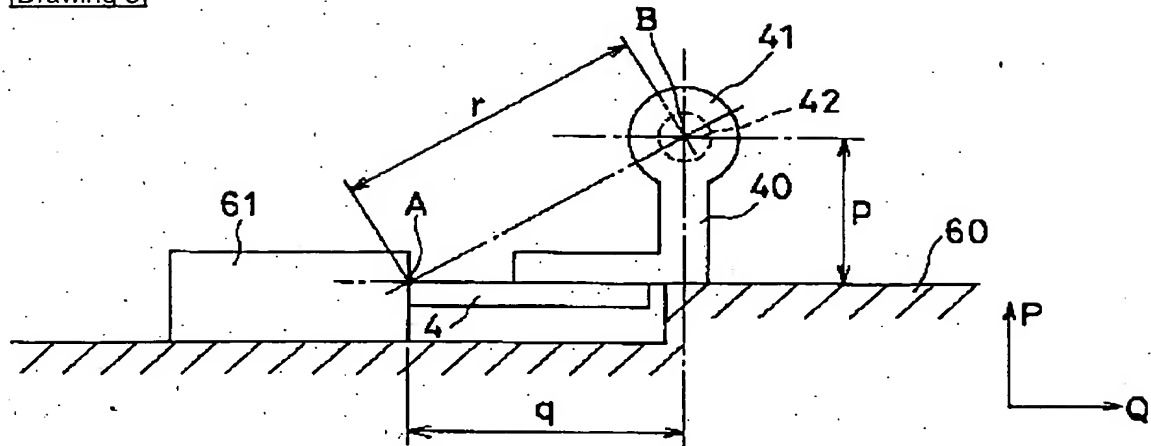
[Drawing 1]



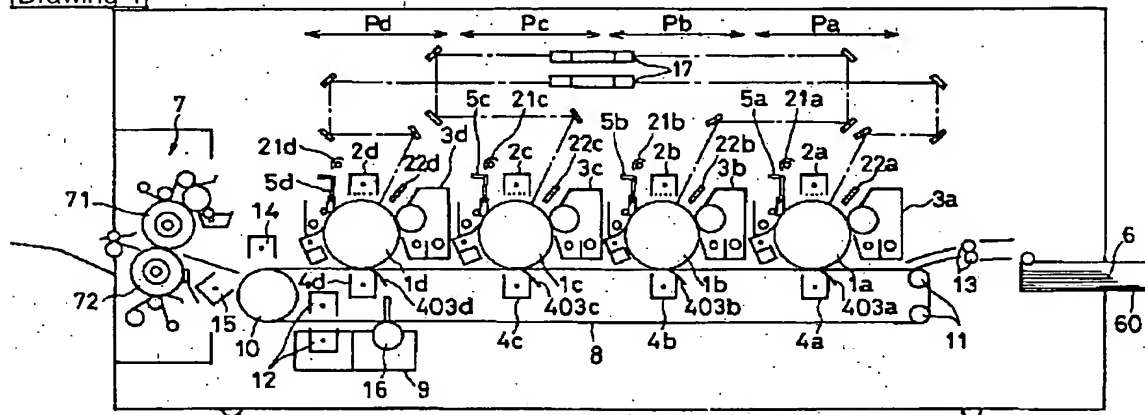
[Drawing 2]



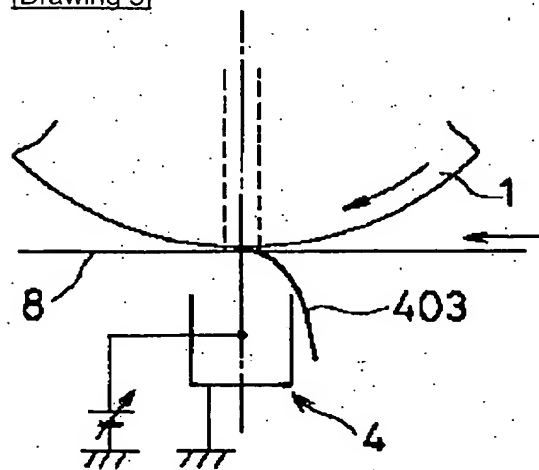
[Drawing 3]



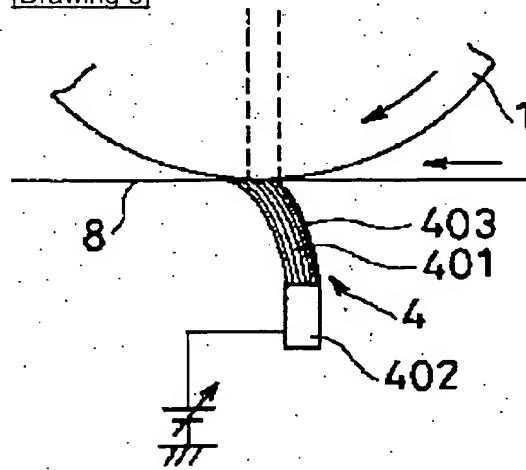
[Drawing 4]



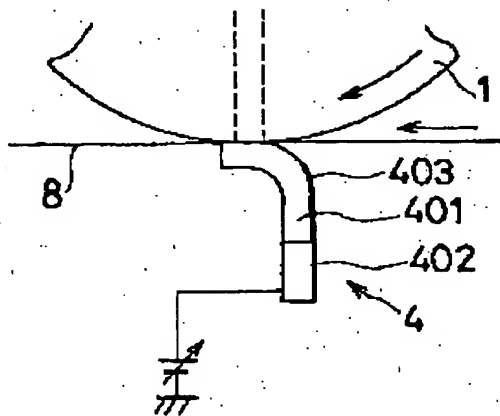
[Drawing 5]



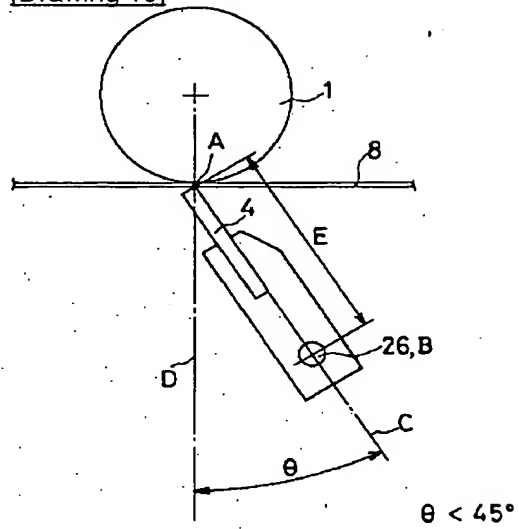
[Drawing 6]



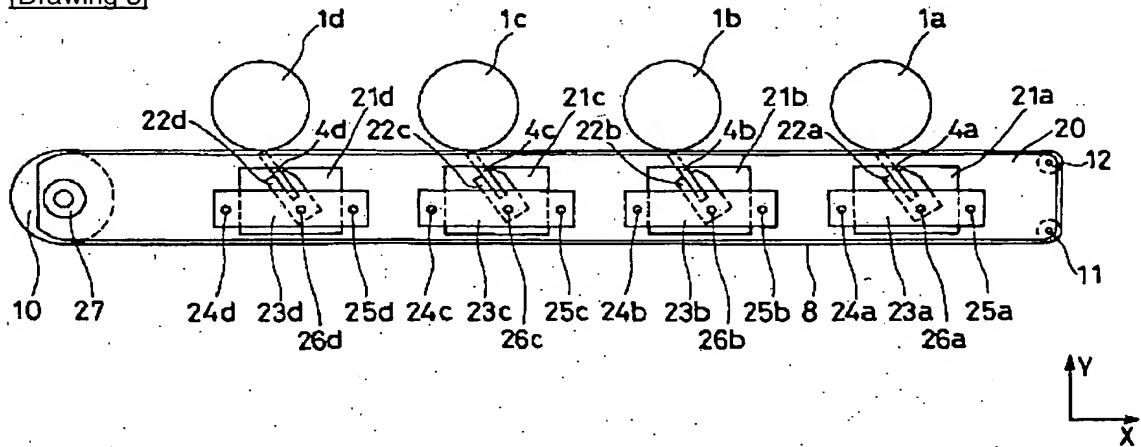
[Drawing 7]



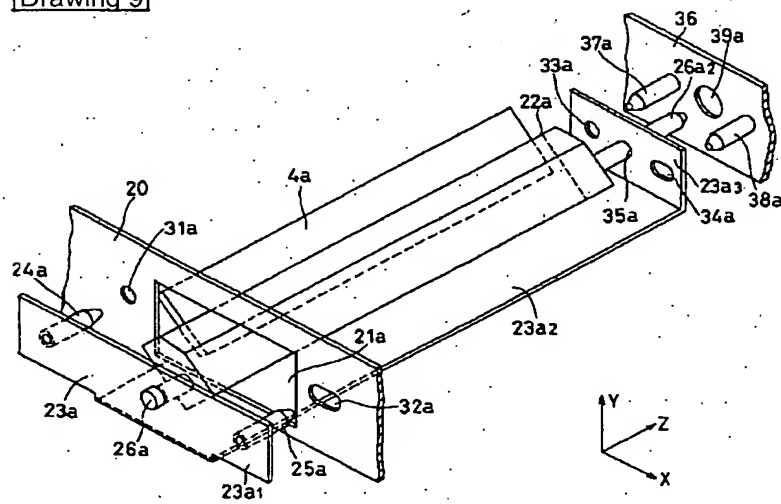
[Drawing 10]



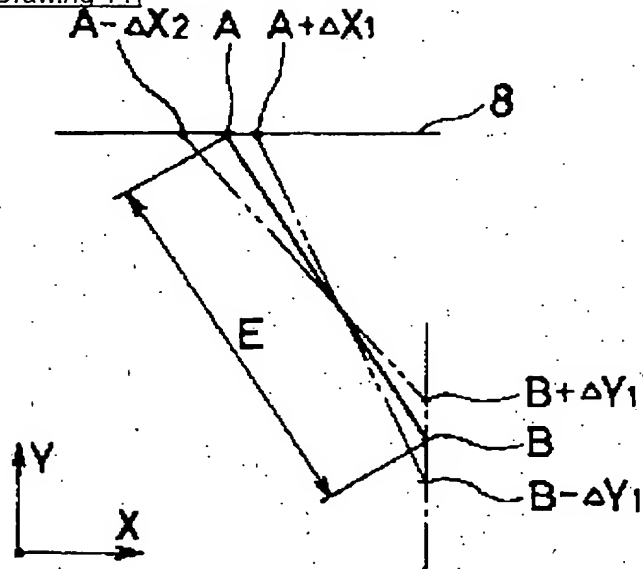
[Drawing 8]



[Drawing 9]

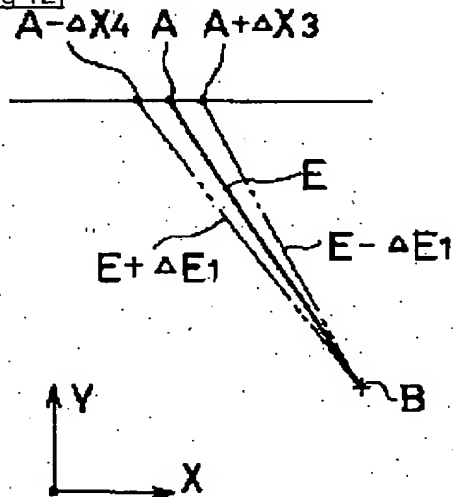


[Drawing 11]



点BのY座標がばらつく場合（便宜上、Eは一定）

[Drawing 12]



長さEがばらつく場合（便宜上、BのX,Y座標は一定）

[Translation done.]

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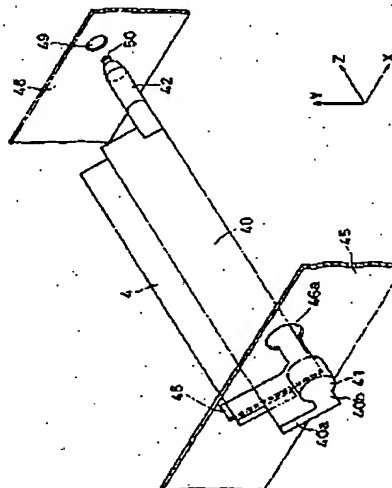
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(54) 【発明の名称】 画像形成装置

(57) 【要約】

【課題】 感光ドラムと転写ベルトが接触する転写材ニップに対して転写ブレードが転写ベルトへ当接する帯電ポイントの位置がはずれることなく、任意位置から所定量以下の寸法のばらつきに抑えて高品質の転写画像を得る。

【解決手段】 転写ブレード4とブレードホルダ40とをV字形に形成し、ブレードホルダ40の端部に設けた前後ボス41、42を、前後側板45、48に穿設した開口46の円形部46aと丸穴49に嵌合して揺動自在に支持し、前後ボス41、42を揺動中心部材と、位置決め部材とを兼ねさせる。



6によって抜き落とされる。ベルトクリーニング手段としては、そのほかに、ブレードあるいは不織布、またはそれらの併用などが一般的によく用いられる。

【0011】上記構成において、感光ドラムのような像担持体1上に形成されたトナー像を転写材6上に良好に転写するために、像担持体1と転写材担持体8の当接点上流側において転写電界を遮断するための規制部材が配置されることがある。すなわち、像担持体1上のトナー像を忠実に再現するような転写を行うためには、転写電界を規制し、トナー像を形成している色剤微粒子、いわゆるトナーが飛び散ることを防止することが必要である。

【0012】このために、図4および図5に示すように、転写帯電手段として一般によく用いられるコロトロン4に規制部材403(403a、403b、403c、403d)を設けることもできるが、最も容易な構成としては、図6に示すようなブラシ形状あるいは図7に示すような板状の電極4、特に板状電極を用いることが効果的に行われている。この板状の接触電極4は、電界付与部材としての板状導電性ブレード401を備え、ブレード401には電極部材402を介して所定の電圧が印加される。この場合にも、転写上流側に電界規制部材403を設けることが提案されている。

【0013】

【発明が解決しようとする課題】しかしながら、上述の画像形成装置において、特に簡便な転写帯電手段として板状接触電極4を用いた場合においては、板状接触電極4の転写材への接触点と、像担持体1との相対位置精度に関してつぎのような問題があった。すなわち、像担持体1が転写材6あるいは転写材担持体8に接する幅(以下「転写材ニップ」という)から、転写材担持体8への板状接触電極4の接触点(以下「帯電ポイント」という)がはずれやすく、転写材6と像担持体1との非接触領域において放電が生じ、転写が正確に行われず、そのため高精細な画像が得られないという欠点があった。

【0014】ここで転写材ニップと帯電ポイントがはずれやすい原因をさらに図8～図11によって説明する。

【0015】図8に、転写材担持体である転写ベルト8、転写ベルト8を回転させかつ張架支持する駆動ローラ10、および2つの従動ローラ11、12を含む転写ベルトユニットと、転写ベルト8の上部に所定間隔をおいてタンデム状に配列された第1～第4感光ドラム1a～1dとの位置関係を示す。

【0016】転写ベルト8が形成する箱状の内部には、板状接触電極である転写ブレード4a～4dと、転写ブレード4a～4dを支持するためのブレードホルダ22a、22b、22c、22dと、ブレードホルダ22a～22dを駆動自在に支持する駆動軸26a、26b、26c、26dを含む転写ブレードユニットが設けられている。

【0017】転写ベルト8の側方には転写ブレード4a～4dを支持するための枠体である前側板20および後側板36(図9参照)が設けられ、前側板20には各転写ブレードユニットを抜き差しするための開口21a、21b、21c、21dが穿設されている。

【0018】転写ブレードユニットは、このユニットを前側板20と後側板36とに支持するための転写ブレード支持板23a、23b、23c、23dをさらに含んでおり、各転写ブレード支持板23a～23dは、前側板20に向けて水平に突出するようにカシメられた第1ピン24a、24b、24c、24dと、第2ピン25a、25b、25c、25dとが前側板20に穿設された穴(図8に不図示)に嵌合することにより位置決めされている。

【0019】感光ドラム1a、1b、1c、1dはそれぞれ装置本体の前側板20と後側板(図8には不図示)で位置決めされている。転写ベルトユニットは駆動ローラ10の回転軸27を中心に駆動可能に構成されており、かつ駆動ローラ10は感光ドラム1a～1dと同様に装置本体の前側板20と後側板によって位置決めされている。

【0020】図9は画像形成部Paに対応する転写ブレード4aの周囲の構成を示す要部斜視図である。

【0021】同図において、転写ブレードユニットは、前述のように、このユニットを前側板20と後側板36とに支持するための転写ブレード支持板23aをさらに含んでいる。転写ブレード支持板23aは、開口21aを覆うように横方向に延びる前立設部23a1と、開口21aの幅幅より小さい幅を有し、ホルダ22aに沿ってその下方を後側板36側に延びる水平部23a2と、水平部23a2の端部から立設する後立設部23a3とから構成されている。

【0022】駆動軸26aはその前部部をボスとして前立設部23a1に、後部部をボスとして後立設部23a3にそれぞれ駆動自在に支持されている。

【0023】転写ブレード支持板23aの前立設部23a1には、前述のように、前側板20に向けて水平に突出するように第1ピン24aと、第2ピン25aとがカシメられ、前側板20には第1ピン24aと第2ピン25aとに対応する位置に丸穴31aと水平方向に長い丸長穴32aとが穿設されている。

【0024】そして第1ピン24aが丸穴31aに嵌合することによってX方向とY方向の位置が決まり、第2ピン25aが丸長穴32aに嵌合することによってY方向の位置が決まるようになっている。

【0025】同様に、後側板36には、転写ブレード支持板23aの後立設部23a3に向けて水平に突出するように第1位置決めピン37aと第2位置決めピン38aとがカシメられ、後立設部23a3には両ピン37a、38aに対して丸穴33aと丸長穴34aとにそ

ホルダ40を前側板45と後側板48すなわち転写ベルトユニットに対して揺動自在に支持される。

【0044】後ボス42から突出した電極50は後側板48の2方向奥側に配設された転写帯電供給電極（不図示）と接触して転写ブレード4に転写高圧を印加する構成とされている。

【0045】転写ブレード4とホルダ40は一体化されていて、ねじりコイルバネ（不図示）によって転写ブレード4の先端部が転写材担持体である転写ベルト8を介して係持体である感光ドラム1に当接する。

【0046】また、転写ブレード4の揺動中心となる部材と位置決め部材を兼ねる前ボス41と後ボス42は前ボス41の径の方が大きく構成されており、当然、前側板45の円形部46aと後側板48の丸穴49を比べると前ボス41と後ボス42の径に対応して円形部46aの方が大きく構成されている。これによって、2方向奥側の後ボス42は前側板45の円形部46aを容易にくぐり抜けることができ、転写ブレードユニットを転写ベルトユニットに対して容易に抜き差しすることができる。

【0047】上記のように本実施例によれば、従来例と比べて転写ブレード支持板23を省略することが可能であり、コスト面でもスペース面でも縮減が可能となるため有利である。

【0048】また本実施例においては、転写帯電手段であるところの板状部材の揺動中心と転写帯電体に対する位置決めを兼ねることにより、従来例と比べて転写材ニップに対して帯電ポイントの位置精度を左右する部品が減るため部品の寸法公差による位置精度の劣化が小さくなる。また、帯電ポイントの位置を転写材ニップの領域内で、理想の位置に保証できるため、画像乱れのない高精細な転写画像を得ることができる。

【0049】図2は転写ブレード4と揺動中心の前ボス41、42の位置関係を示す概略正面図である。

【0050】転写ブレード4の揺動中心41、42は、転写ブレード4が転写ベルト8に当接する帯電ポイントAと揺動中心Bを結ぶ直線Cに注目すると、転写位置における感光ドラム1の法線Dに対する角度 θ が45°より大きく、90°に近い値で設定されている。

【0051】このように、揺動中心の位置を、感光ドラムの法線に対して45°以上の範囲に設けたことにより、揺動中心の位置の理想の位置からのずれがある程度大きい場合でも、帯電ポイントの位置は幾何学的に純感になり、理想的な範囲に保証できるため、高精細な転写画像を得ることができる。

【0052】また、転写ブレード4は法線Dに対する角度 ϕ が θ より小さくなるように設定されている。

【0053】転写帯電手段が板状部材あるいはブラシ状部材である場合に、揺動中心を感光ドラムの法線に対して $\theta > 45^\circ$ でより90°に近づけた構成であっても、

板状あるいはブラシ状部材の体勢を法線に対してなす角度 ϕ を $\phi < \theta$ で設定したため、帯電ポイントの上流近傍で放電を起こして画像を乱すことなく高精細な転写画像を得ることができる。

【0054】また、図3は本発明で提案する転写ブレードの位置精度保証のための調整の概念図である。

【0055】図中のハッチング部は調整治具の基準面60であり、基準面60には該面上をQ方向へ位置を調整できる付き当てブロック61が設置されている。ボス41、42の中心はホルダ40の部品精度によって図中寸法pはある程度ばらつくため、モニタ手段（不図示）によって寸法pを読み取り、帯電ポイントとなるA点と揺動中心となるB点を結ぶ図中寸法rが一定となるように、ブロック61を位置調整する。この時点では転写ブレード4とホルダ40はまだ一体化されておらず、Q方向へ相対的に滑らすことが可能である。

【0056】pの値に基づいてqの値が決められて、ブロック61が位置調整されているわけだから、転写ブレード4をブロック61に付き当てた状態で転写ブレード4とホルダ40をビス等（不図示）によって一体化することで転写ブレード4の先端Aと、揺動中心兼位置決め中心Bとの距離AB=rはかなりの高精度に一定に保証することができる。

【0057】このように、板状部材の先端部と揺動中心との距離を一定に保証する調整方法を施すことにより、板状部材と関連する部材の寸法公差が大きくばらついたとしても、その影響を全く受けることがなく、帯電ポイントの位置が保証されるため、高精細な転写画像を得ることができる。

【0058】また、近年、装置の小型化、低コスト化のために、感光ドラムは直径20～30mmの比較的小径のものが利用されるようになってきている。これに伴って、トナー像を密着して転写することのできる転写材ニップはますます小さくなる方向であり、帯電ポイントの位置精度を保証する本発明の効果は今後ますます重要性を増していくものと予想される。

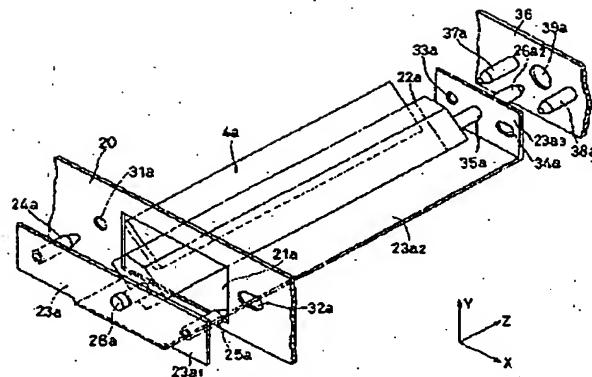
【0059】

【発明の効果】以上の説明から明らかなように、本発明の画像形成装置によれば、転写帯電手段が、転写材担持体が回転自在に張設されたローラ部材を支持する本体に揺動自在に支持され、その揺動中心となる部材が副記号体に対する位置決め部材を兼ねることにより、係持体と転写材担持体が接触する転写材ニップに対して転写帯電手段が転写材担持体へ当接する帯電ポイントの位置がはずれることなく、理想位置から所定量以下の寸法のばらつきに抑えることができ、よって高品質の転写画像を得ることができる。

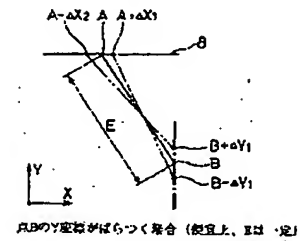
【図面の簡単な説明】

【図1】本発明に係る転写ブレードの一実施例を示す要部斜視図である。

【図9】



【図11】



【図12】

